

APRIL/MAY 2023

DECH43A — INORGANIC CHEMISTRY — IV

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

How linear and bent nitrosyls can be differentiated by IR spectroscopy?

What is the requirement for a vibration to be Raman active?

3. How does the electric field gradient arise in NQR?
4. Sketch the ^{19}F NMR spectrum of IF_5 and explain.
5. Write and explain Zeeman equation.
6. Explain fine structures observed in PES.
7. Write the principle of AAS.
8. Point out the different types of detectors used in HPLC.
9. Write the Principle of amperometry.
10. What are the reasons for using dropping mercury electrode in polarography?



SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Distinguish the following linkage isomers by IR spectroscopy M-SCN and M-NCS; M-NO and M-ON.

Or

- (b) Outline the application of Raman spectroscopy in finding out the nature of bonding in complexes.

12. (a) Explain the ^{19}F – NMR spectrum of SF_4 and ClF_3 .

Or

- (b) Illustrate the nature of magnetic hyper fine splitting of the MB signal for ^{57}Fe and ^{57}Sn .

13. (a) Explain Kramer's theorem and its consequences.

Or

- (b) Explain the principle and techniques of PES?

14. (a) Discuss the principles and applications of AAS.

Or

- (b) Describe the theory and application of atomic emission spectroscopy.

15. (a) Outline the advantages and applications of Laser Raman spectroscopy.

Or

- (b) Give a brief account of the qualitative and quantitative applications of polarographic measurements to inorganic systems.

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Explain the usefulness of infra-red and ultraviolet spectra in the structural elucidation of organometallic compounds, with examples.

17. Give the principle underlying in NQR spectroscopy. What is the structural information provided by NQR in the study of complexes?

18. Give a detailed account on ESR spectrum of copper and vanadyl complexes.

19. Discuss the principle, instrumentation and applications of HPLC.

20. Discuss the principle and instrumentation of polarography.